

Where Are We In The NEPA Process?

This is the third issue of *About Angostura*. Copies of the first two newsletters issued in October 1997 and December 1998 are still available if you did not receive one.

We're using this issue to update you on the National Environmental Policy Act (NEPA) process and the upcoming Preliminary Draft Environmental Impact Statement (PDEIS). Other issues covered in this newsletter are water quantity, water quality, fish health, socio-economics, stream corridor and the geographic information system (GIS).

Preliminary Draft Environmental Impact Statement

In January 2000 Reclamation will be completing the PDEIS for review by nine cooperating agencies. To refresh your memory the cooperating agencies are:

- * Angostura Irrigation District
- * Bureau of Indian Affairs, DOI
- * Cheyenne River Sioux Tribe
- * Lower Brule Sioux Tribe
- * Natural Resources Conservation Service, USDA
- * Oglala Sioux Tribe
- * South Dakota Department of Environment and Natural Resources
- * South Dakota Department of Game, Fish & Parks
- * U.S. Geological Survey, DOI

We have reached an important milestone in the NEPA process. These cooperating agencies represent you in the development of this PDEIS. Prior to the Draft EIS (DEIS) to be made available for your review, these agencies and Tribes will have had the opportunity to complete their technical review and provide comments on the PDEIS.

Cooperating agencies will have approximately 30 days to review and comment on the PDEIS. Reclamation will incorporate their comments into the DEIS which will then be distributed for your 60-day review and commentS. Afterward Reclamation will either make changes or respond to your comments in the Final EIS (FEIS), or may even rewrite the DEIS. Here's what we're shooting for in terms of a schedule:

January 2000

Distribute Preliminary Draft EIS to Cooperating
Agencies and Tribes

February 2000

If needed, Cooperating Agency and Tribal
government-to-government meetings

March 2000

Publish Draft EIS

April or May 2000

Public Workshops - Meetings - Hearings

July 2000
Publish Final EIS and Record of Decision

Since our last newsletter Reclamation has completed four working drafts of the EIS. Time was needed to incorporate and analyze the significant amount of water quantity and water quality, Indian Trust Assets, socio-economics, and other databases to make it easier to understand. Now that the data analysis is completed, and the PDEIS is out for review and comment, the remainder of this NEPA process should stay on schedule.

Alternatives

The four alternatives being analyzed in the EIS have not changed since our last newsletter in December 1998. In abbreviated form, they are:

- * The ***No Action Alternative***. This alternative would entail no change in the water service contract with the Angostura District beyond those required by law, and no changes in water management at the reservoir.
- * The ***Re-establishment of Natural Flows Below the Dam Alternative***. As the title implies, this alternative would re-establish natural flows as much as possible in the Cheyenne River downstream of the dam.
- * The ***Improved Efficiencies Alternative***. This alternative would implement measures to save irrigation water and create a committee to advise on how the saved water would be used.
- * The ***Reservoir Recreation and Fisheries Alternative***. This alternative would give priority to recreational use and fisheries at the reservoir.

Water Quantity

Angostura Reservoir is the only reliable water supply source to the district and Cheyenne River below the reservoir. Return flows from irrigated lands in the district also contribute flows to the Cheyenne River in the area below the reservoir and Red Shirt. The historic inflow data adjusted for evaporation and precipitation from the period of 1953 through 1997 was used to develop runoff above the reservoir. Alternatives were analyzed by the Angostura Reservoir Annual Operation Plan (AGRAOP), which uses the River Operations Modeling System (ROMS). This model uses the inflow to show probable demands on the reservoir from the district for period of study 1998-2042 and analyzed reservoir end of month (EOM) content, EOM elevation, canal discharge and Cheyenne River discharge.

This analysis showed that the average annual EOM content was reduced from historic conditions (112,100 acre-feet) to future years 1998-2042 by about 28% to 43% (81,100 to 63,600 acre-feet) depending on the alternative due to sediment deposition in the reservoir. The average annual EOM elevation increased from about 0% to 6% (3179.8 to 3184.9 feet) over the study period. River discharge is increased from historic conditions (59.9 cfs) by about 1% to 48% (60.2 to 88.8 cfs) depending on the alternative. Average canal discharge is reduced from historic conditions by about 0% to 55% (55.1 to 25 cfs) depending on the alternative. Highest annual irrigation shortages for future years 1998-

2042 is about 0% to 75% (0 to 37,000 acre-feet) depending on the alternative.

Future sediment deposition was estimated to be about 985 acre-feet per year based on the 1979 sediment survey. Figure 1 shows estimated reservoir capacity versus 10-year sediment distribution based on Reclamation Distribute Sediment program (DISSED) for period 1950 through 2100. The year 2064 shows that the inactive and dead pool will be full of sediment and active conservation pool will have about 45,000 acre-feet in the reservoir. The effective life of any reservoir is the period of time during which sufficient reservoir capacity is available to provide all the benefits for which the reservoir is constructed. Benefits continue to occur after the effective life, but at a continually-reducing rate due to encroachment on reservoir area and capacity by sediment deposition.

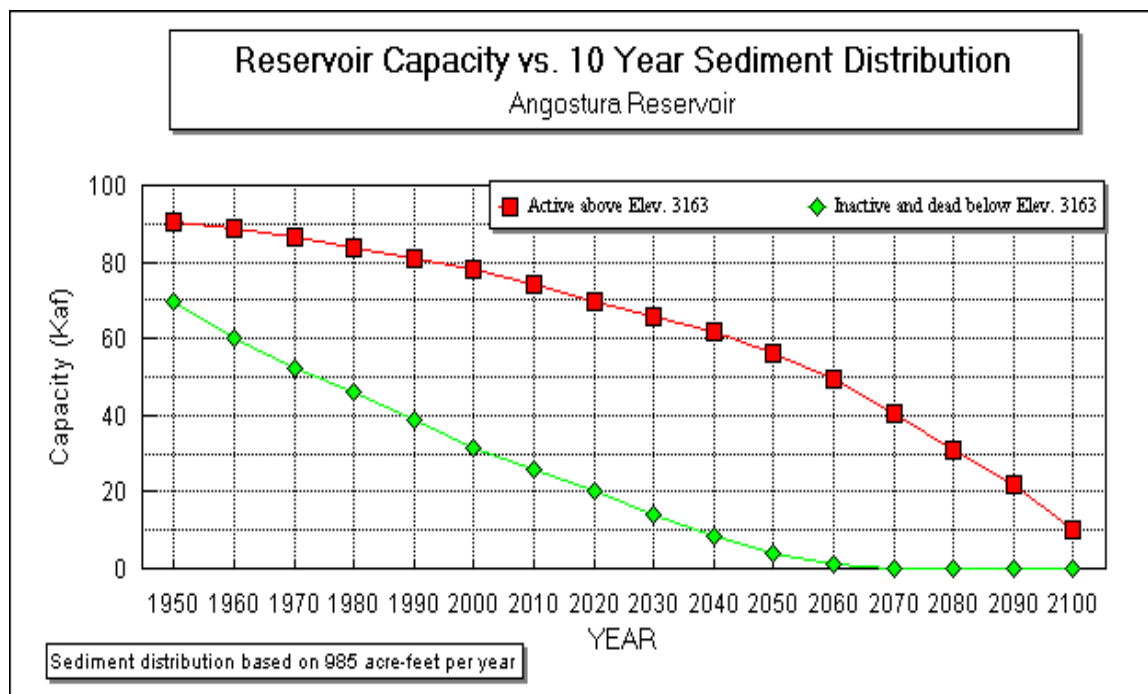


Figure 1 - Reservoir Capacity versus 10 year Sediment Distribution

Water Quality

There are several water quality studies that have a bearing on the Angostura water contract environmental impact statement process. In 1988 the National Irrigation Water Quality Program (NIWQP) of the Department of the Interior (DOI) conducted a study of the Angostura Unit and its effects on the water quality of the Cheyenne River and its biota (Greene *et al.*, 1990). In 1994, the NIWQP did a follow-up or verification study on the water quality aspects of the 1988 study; this study has not yet been published but the data is available from the EPA STORET database. These two studies are to be used to characterize the effects of the Angostura Unit on water quality.

The Oglala Sioux Tribe (OST) has also been concerned about the water quality of the Cheyenne River. The OST has monitored the water quality of the Cheyenne River in the vicinity of Red Shirt Village since 1993. The data have been published in Hoof (1998). The OST has provided their monitoring data for use in the Angostura Unit EIS. The OST monitoring data will be used to supplement the NIWQP data.

The Cheyenne River Sioux Tribe (CRST) has also been concerned about the water quality of the Cheyenne and Moreau rivers; only the Cheyenne River is a concern to the Angostura Unit contract renewals. The CRST sponsored a study of water quality trends in the Cheyenne and Moreau rivers by the USGS (Heakin, 1998). Water quality and fish were sampled during July and August 1997 (Plateau, 1997). These data have also been provided to Reclamation. Under the sponsorship of the Environmental Protection Agency (EPA), the CRST has also undertaken a sediment monitoring project in the Cheyenne and Moreau rivers (CRST, 1997); the contaminants data from that project have also been provided to Reclamation for use in the EIS preparation.

Reclamation sampled the Cheyenne River and Angostura Reservoir during 1997. Reclamation samples included sites on the river from upstream of Angostura Reservoir to the Cheyenne River Indian Reservation. The data from all of the above sources will be integrated into a data set and will be used to characterize the water quality of the Cheyenne River as a baseline for the Angostura contract renewal.

Fish Health

Reclamation, Oglala Sioux Tribe, South Dakota Game, Fish & Parks, South Dakota State University, and the U.S. Fish & Wildlife Service collected fish samples from three sites in the Cheyenne River during August 1997 and 1998. Those sites are 3/4 mile below the dam (1998), Oral (1997) and Red Shirt-Fairburn (1997 and 1998). The purpose of the sampling was to follow up on the sampling and analysis conducted under the NIWQP in 1988 (Greene *et al.*, 1990). The NIWQP did a follow-up to the 1988 study in 1994, but only water samples were collected. A report on this verification study is in preparation. The 1997 sampling by Reclamation was conducted on a much reduced scale in comparison to that of Greene *et al.* (1990) and was meant to supplement the NIWQP verification study.

The Reclamation fish samples were analyzed for eight trace elements and a variety of organic contaminants, including herbicides, insecticides, and several polychlorinated biphenyl (PCB) isomers. A report for the EIS prepared by Jim Yahnke, Reclamation, focused primarily on trace elements. The vast majority of the organic analyses yielded results that were below detectable concentrations.

Economic Analysis

The economic analysis for the Draft EIS is an expansion of the work completed for the Appraisal Study Report, September 1996.

The analysis for the EIS will consist of a socio-economic assessment of the study area, estimation of regional impacts on the agricultural sectors and recreation-related sectors based on changes in water supplies and reservoir elevations. The regional impact model was developed in the Appraisal Report and will be used for the draft EIS to estimate any impacts. Below is a brief summary of the work completed to date:

- A. **Socio-economic assessment:** Data has been collected on county population, employment, and income. Additional demographic data such as unemployment levels, housing (number of single and multifamily units), and education levels have also been collected.

- B. **Agricultural Impacts:** Data has been collected on the feed lot operation in the study area. This data has been incorporated into the regional impact model to account for the economic activity within the region that is generated by the feed lot operations. Information from the irrigation district on how a change in water supplies will impact the amount of acres irrigated and what crops would be grown has been obtained.
- C. **Recreation Impacts:** Recreation visitation data at Angostura Recreation Area has been provided by South Dakota Department of Game, Fish and Parks for the years 1970 to 1996. Also, camping revenue data was provided for some years. Work has been conducted to develop a recreation visitation model that is affected by changes in reservoir elevations. The purpose of the model is to aid in the analysis on the impacts on recreation to changes in reservoir elevations for each alternative. To date the reservoir elevation variable is a significant indicator in explaining changes to camping visits at Angostura reservoir. A model has been developed and runs for each alternative have been made based on differing reservoir levels. The change in recreation activity due to the different reservoir levels will be used to estimate regional economic impacts.
- D. **Reservation Impacts Analysis:** A socio-economic assessment was prepared for the Pine Ridge reservation. Data that was available was collected on reservation population, employment, unemployment and other demographic information. An attempt was made to present data as consistent as possible with the rest of the study area. The tribe provided important information on the town of Red Shirt.

GIS And Stream Corridor

A geographical information system (GIS) user-friendly database has been developed with the ArcView 3.0a software for this study, and is being used as an interpretive model that enables the geographical referencing of water quality monitoring data, hydrological stream gage data, and other data that may be relevant to the EIS. The GIS also includes the geographic features such as topography, hydrography, roads, property boundaries, and canal and lateral locations. All of the data and project files are included on two CDs and were developed to work within a personal computer's C: drive.

An example of GIS databases and analysis used for this EIS is stream corridor. The stream corridor includes the stream channel and nearby riparian areas. Within the stream corridor, the channel and its floodplain are formed and maintained primarily through erosion, transport, and deposition of sediment by river flows. Riparian areas exist within a stream corridor at the joining of aquatic and upland ecosystems. For many western streams, riparian areas exist as a narrow band of vegetation bordering the stream channel. Dam operations affect flows, sedimentation, and riparian areas. For purposes of this EIS, present conditions were compared to pre-dam conditions to analyze effects of river regulation. High quality black-and-white aerial photography of the Cheyenne River from October-November 1948 was used to represent pre-dam conditions, while July-August 1991 photographs represented post-dam conditions at present. Information from these photographs was digitized and a GIS database was developed for interpretive analysis.

Results of this study will be in the EIS, Chapter 3, Stream Corridor.

In the future, this GIS can be used in the analysis during the formulation of the Resource Management Plan (RMP) for the Angostura Unit.

If you have any questions or comments, or want copies of previous newsletters, please contact Kenneth Parr by phone at 605-394-9757, Ext. 3004, by FAX at 605-394-9346, or by Email: KPARR@gp.usbr.gov.

We have now been at the Rapid City Field Office for nearly a year and a half. If you wish to stop by and visit or drop a note, the address is 515 9th Street, Room 101, Rapid City, SD 57701.